

IN THE CLAIMS:

Kindly change claims 1 through 3; and claims 11, 12, 14, 17, 21 and 22 — all to read as indicated below.

1    1. (currently amended) A method of preparing for actual  
2    hardcopy incremental printing of a color image; said  
3    method comprising:

4        receiving or generating data representing a device-  
5        color implementation of the image, including respective  
6        initial representations of at least black ink and chro-  
7        matic-color inks; and

8        applying a substantially direct transform to:

9

10        extract, from the initial representations,  
11        and modify quantity of black ink  
12        represented in the data, and

13

14        recombine the modified quantity of black  
15        ink with the initial representations.

1    2. (currently amended) A [[The]] method of preparing  
2    for incremental printing of a color image; said method  
3    comprising: [[claim 1,]]  
4        receiving or generating data representing a device-  
5        color implementation of the image, including respective  
6        initial representations of at least black ink and chro-  
7        matic-color inks; and  
8        applying a substantially direct transform to:  
9  
10        extract, from the initial representations,  
11        and modify quantity of black ink  
12        represented in the data, and  
13  
14        recombine the modified quantity of black  
15        ink with the initial representations;  
16  
17        wherein the applying step comprises automatic modi-  
18        fication of [[:]] black ink represented in the data, in  
19        highlight and midtone regions of the image.

1   3. (currently amended) A [[The]] method of preparing  
2   for incremental printing of a color image; said method  
3   comprising: [[claim 1,]]  
4       receiving or generating data representing a device-  
5   color implementation of the image, including respective  
6   initial representations of at least black ink and chro-  
7   matic-color inks; and  
8       applying a substantially direct transform to:  
9  
10      extract, from the initial representations,  
11       and modify quantity of black ink  
12       represented in the data, and  
13  
14      recombine the modified quantity of black  
15       ink with the initial representations;  
16  
17      wherein the applying step comprises automatic modi-  
18   fication of:  
19  
20      black ink represented in the data, primarily in  
21       highlight and midtone regions of the im-  
22       age, to mitigate graininess in those re-  
23       gions; and  
24  
25      black ink represented in the data, in darker  
26       regions of the image, to smoothly blend  
27       black-ink quantities in the darker regions  
28       with the modified black-ink quantities in  
29       the highlight and midtone regions.

1   4. (original) The method of claim 3, wherein the auto-  
2   matic modification of black comprises establishing:  
3         a black-ink onset point; and  
4         an increasing function of said initial representa-  
5   tion of black ink, in regions of an image darker than the  
6   onset point.

1   5. (original) The method of claim 4, wherein the auto-  
2   matic modification of black further comprises:  
3         merging said function into substantially a black-  
4   identity function in darkest regions of an image.

1   6. (original) The method of claim 3, wherein the apply-  
2   ing step further comprises automatic modification of:  
3         chromatic-color inks to accommodate the black-ink  
4   modifications.

1   7. (original) The method of claim 6, wherein:  
2         the applying step comprises automatically recombin-  
3   ing the modified quantity of black in a way that is in-  
4   versely proportional to the initial representations of at  
5   least the chromatic-color inks.

1   8. (original) The method of claim 7, wherein:  
2         the automatically recombining comprises finding in a  
3   lookup table new quantities of said representations, cor-  
4   responding to said quantified black-modifying.

1    9. (original) The method of claim 7, wherein:  
2         final ink representations C', M', Y' and K' for  
3         cyan, magenta, yellow and black respectively are found  
4         from the expressions:

5

$$\begin{aligned}6 \quad C' &= C + (1 - C) \cdot A_c(K) \\7 \quad M' &= M + (1 - M) \cdot A_m(K) \\8 \quad Y' &= Y + (1 - Y) \cdot A_y(K) \\9 \quad K' &= A_k(K),\end{aligned}$$

10

11         where C, M, Y and K are the initial representations of  
12         the same colors respectively, and A<sub>c</sub>, A<sub>m</sub>, A<sub>y</sub> and A<sub>k</sub> are  
13         respective preestablished automatic black-replacement  
14         functions.

1    10. (original) The method of claim 2, wherein:  
2         the direct transform application comprises finding  
3         in a lookup table new quantities of said representations,  
4         corresponding to said quantified black-modifying.

1   11. (currently amended) A [[The]] method of preparing  
2   for incremental printing of a color image; said method  
3   claim 1, further comprising the steps of:  
4       receiving or generating data representing a device-  
5   color implementation of the image, including respective  
6   initial representations of at least black ink and chro-  
7   matic-color inks; and  
8       applying a substantially direct transform to:  
9  
10      extract, from the initial representations,  
11      and modify quantity of black ink  
12      represented in the data, and  
13  
14      recombine the modified quantity of black  
15      ink with the initial representations;  
16      and  
17  
18      splitting at least one of the final ink representa-  
19   tions to implement the at least one representation in  
20   available light and dark colorants.

1   12. (currently amended) The method of claim 1, wherein:  
2       color initially having no black-ink component is  
3   passed through, without modification, substantially to  
4   said actual hardcopy printing.

1   13. (original) The method of claim 1, further compris-  
2   ing the step of:  
3       applying the data with recombined black ink in  
4   printmasking for hardcopy printing.

1   14. (currently amended) A [[The]] method of preparing  
2   for incremental printing of a color image; said method  
3   [[claim 1,]] comprising the steps of:  
4       receiving or generating data representing a device-  
5   color implementation of the image, including respective  
6   initial representations of at least black ink and chro-  
7   matic-color inks; and  
8       applying a substantially direct transform to:  
9  
10      extract, from the initial representations,  
11       and modify quantity of black ink  
12       represented in the data, and  
13  
14      recombine the modified quantity of black  
15       ink with the initial representations;  
16  
17      a human operator's manipulation of a control that  
18   selects an amount and a direction of black-ink modifica-  
19   tion; and  
20      thereafter, substantially automatic operation of  
21   said direct transform to effectuate the modifying and re-  
22   combining parts of the applying step according to the  
23   operator's selection.

1       15. (original) An incremental printing system for form-  
2       ing an image by construction from dots deposited on a  
3       printing medium, based upon original image data in de-  
4       vice-color space; said system comprising:

5               a direct device-color to device-color substantially  
6       automatic computation module for modifying color image  
7       data with no manipulation in terms of perceptual color  
8       parameters; and

9               an output incremental printing stage for printing  
10      the image from the modified data.

1       16. (original) The system of claim 15, wherein the aut-  
2       omatic module comprises:

3               an input for receiving such original image data in  
4       the form of initial four-or-more-color separations; and

5               an output for directing four-or-more-color separa-  
6       tions to the output stage.

1   17. (currently amended) An incremental printing [[The]]  
2   system for forming an image by construction from dots  
3   deposited on a printing medium, based upon original image  
4   data in device-color space; said system comprising:  
5       a direct device-color to device-color substantially  
6       automatic computation module for modifying color image  
7       data with no manipulation in terms of perceptual color  
8       parameters; and  
9       an output incremental printing stage for printing  
10   the image from the modified data; of claim 15,  
11    wherein the automatic module comprises a computation  
12   submodule for establishing:  
13  
14        a black-ink onset point; and  
15  
16        an increasing function of an initial amount of  
17       black ink, in regions of an image darker  
18       than the onset point.

1   18. (original) The system of claim 17, wherein the  
2   automatic module further comprises:  
3       a computation submodule for merging said function  
4   into substantially a black-identity function in darkest  
5   regions of an image.

1       19. (original) An incremental printing method for form-  
2       ing an image by construction from dots deposited on a  
3       printing medium, based upon original image data in  
4       device-color space; said method comprising the steps of:

5                 a direct device-color to device-color substantially  
6       automatic computation to modify color image data with no  
7       manipulation in terms of perceptual color parameters; and  
8                 then incrementally printing a hardcopy image from  
9       the modified data.

1       20. (original) An incremental-printing image-prepara-  
2       tion method, for accommodating personnel who are accus-  
3       tomed to thinking in terms of ink combinations rather  
4       than in terms of numerical perceptual color models; said  
5       image to be printed based upon an original image data  
6       file that substantially expressly represents inking to be  
7       used; said method comprising the steps of:

8                 receiving from said personnel an indication of quan-  
9       tity of black ink and other inks desired, in the form of  
10      at least four color separations, for use in incremental  
11      printing; and

12                 in preparing for incremental printing, directly and  
13       automatically implementing changes in represented quan-  
14       tity of black ink, for colors that initially have black  
15       ink.

1    21. (currently amended) An incremental-printing image-  
2    preparation method, for accommodating personnel who are  
3    accustomed to thinking in terms of ink combinations rath-  
4    er than in terms of numerical perceptual color models;  
5    said image to be printed based upon an original image  
6    data file that substantially expressly represents inking  
7    to be used; said method comprising the steps of:  
8        receiving from said personnel an indication of quan-  
9        tity of black ink and other inks desired, in the form of  
10      at least four color separations, for use in incremental  
11      printing; and  
12        in preparing for incremental printing, directly and  
13        automatically implementing changes in represented quan-  
14        tity of black ink, for colors that initially have black  
15        ink; of claim 20,  
16        wherein [:] the change-implementing step comprises  
17        automatic reduction of black ink represented in the data,  
18        primarily in highlight and midtone regions of the image,  
19        to mitigate graininess in those regions.

1   22. (currently amended) An incremental-printing image-  
2 preparation method, for accommodating personnel who are  
3 accustomed to thinking in terms of ink combinations rather  
4 than in terms of numerical perceptual color models;  
5 said image to be printed based upon an original image  
6 data file that substantially expressly represents inking  
7 to be used; said method comprising the steps of:  
8           receiving from said personnel an indication of chan-  
9 ge in quantity of black ink desired, in incremental  
10 printing; and  
11           directly implementing the indicated change, in pre-  
12 paring for actual incremental hardcopy printing.

1   23. (original) The method of claim 22, wherein:  
2           the indication is substantially without reference to  
3 any perceptual color model.

1   24. (original) The method of claim 22:  
2           wherein the implementing step comprises automatic  
3 adjustment in quantities of chromatic inks, compensating  
4 for the indicated change in quantity of black ink;  
5           wherein said compensating comprises substantially  
6 maintaining tonal values in areas of ink change; and  
7           further comprising the step of applying the data  
8 file with the implemented change, to printmasking for  
9 hardcopy printing.

1    25. (original) An incremental printing system for form-  
2    ing an image by construction from dots deposited on a  
3    printing medium, based upon original image data in  
4    device-color space, under control of a user; said system  
5    comprising:

6         a direct device-color to device-color graphical com-  
7         puter interface module for enabling the user to modify  
8         color image data in preparation for printing, without re-  
9         quiring the user to directly manipulate perceptual color  
10      parameters; and

11         an output incremental printing stage for printing  
12      the image from the modified data.

1    26. (original) The system of claim 25, wherein the  
2    interface comprises controls enabling the user to set  
3    substantially directly:

4         a black-onset point; and

5         an increasing function of an initial amount of black  
6         ink, for black-containing colors darker than the black-  
7         onset point.

1    27. (original) The system of claim 26, wherein:

2         the interface further comprises controls enabling  
3         the user to substantially directly set merging of said  
4         function with a black-identity function in darkest re-  
5         gions of the image.